Uganda Energy Policy Support

Report of the stakeholder consultations 24-28 August, 2009

Painuly, J.P.; Agbemabiese, Lawrence

Publication date:
2009

Document Version
Publisher's PDF, also known as Version of record

UNEP RISØ CENTRE

ENERGY, CLIMATE AND SUSTAINABLE DEVELOPMENT

UGANDA ENERGY POLICY SUPPORT

(Report of the stakeholder consultations 24-28 August, 2009)

Jyoti Prasad Painuly

UNEP Risoe Centre, Risø-DTU, Denmark

and

Lawrence Agbemabiese

UNEP-DTIE, Paris

December 2009

UNEP Risø Centre
Risø National Laboratory for Sustainable Energy
Technical University of Denmark – DTU
P.O.Box 49
DK-4000 Roskilde, Denmark

Phone +45 4632 2288
Fax +45 4632 1999
unep@risoe.dk
www.uneprisoe.org

Background

In line with the UNEP agreement with Ministry of Energy and Mineral Development (MEMD), Uganda, a UNEP team consisting of Lawrence Agbemabiese from UNEP, DTIE, Paris and Jyoti Prasad Painuly, UNEP Risoe Centre, Denmark visited Uganda for stakeholder consultations with a view to identify opportunities for Uganda in the area of renewable energy . The mission was coordinated by MEMD and discussions were held with various stakeholders during the week 24-28 August 2009. This report summarises the discussions and indicates the potential activities that could be explored further for implementation in Uganda with the assistance of UNEP or other agencies.

Conclusions from Stakeholder Discussions

Based on discussions with stakeholders, the following items were identified as possible areas where UNEP could provide further support.

1. Strengthen and work with the Uganda Energy Credit Capitalization Company in their small solar loan schemes.
2. Support small enterprises in energy area
3. Support initiatives in the area of household energy efficiency improvements to compliment on-going efforts of others in this area
4. Strengthen / support biogas initiatives, where there is room for improvement.

One or two of these items could be developed further in consultation with MEMD. The UNEP team was able to meet only Mr. Michael Ahimbisibwe on the last of the mission to apprise of the findings. Even during the mission, though initially scheduled, the UNEP team could not meet the government official in the MEMD, including Permanent Secretary (Energy), Director (Energy), Commissioner (Energy) and others. Since they are the key decision makers in the MEMD, it would be important to know their views and finalise the item /items after that. Also, active participation and support by MEMD will be needed during elaboration of the ideas and preparation of proposal for the selected item / items.

Discussions with Stakeholders

Day 1: 24-08-09

Ministry of Energy and Mineral Development

(Mr. Wafula Wilson and Mr. Michael Ahimbisibwe)

Initial discussions were held with Mr. Wafula Wilson, Senior Energy Officer, MEMD on objectives of the mission and the programme that had been previously discussed through email exchange. Mr Wafula gave a list of stakeholders that the UNEP team could meet during the mission. Tentative contacts with

some of them had been made by Mr. Wafula. Mr. Michael Ahimbisibwe from MEMD also joined the discussions. They briefly explained the institutional structure of the Energy Department within the Ministry and some of its activities in energy area. UNEP team apprised them of the UNEP activities in the renewable energy area.

One of the interesting projects mentioned by MEMD was "**UNDP Solar PV Project, 1998-2003".** The project was aimed at creating awareness, building capacity that included technical training and training on business model development, establishing a financial model, and demonstration. The financial model used included financing support both for vendors and end users. In all, 2700 solar home systems (SHS) with average size of 50 W were sold through the project. Two banks participated in the project with a guarantee facility established by the project to cover their risk. Vendors to the project formed an association known as Uganda Renewable Energy Association, which formed a code of ethics for its members to ensure quality control. The financing model for end user used included the following support;

(i) Interest rate of 18% (on reducing balance) to end users as against the then prevailing rate of 38-42%,

(ii) Re-payment flexibility with seasonal payment terms to cater to customers with seasonal income,

(iii) Security conditions relaxed with SHS accepted as security,

(iv) Lower down payment requirement at 5-10 % of SHS price,

(v) Repayment over a period of two years (a liberal time frame for that time).

The model worked well with non-repayment merely at 5-6 %. As a result, most of the money given as loan came back. But the prevailing laws did not allow the Ministry to use that to continue the project. As soon as the project ended, UREA also collapsed, resulting in a lack of control for SHS in the market. The programme thus did not sustain.

With access to electricity at less than 10 per cent and high connection costs, Uganda has a lot potential for off-grid systems to provide electricity to households.

Day 2 : 25-08-09

Participation in a half-day Consultative Workshop on Balancing Biofuels and Food Security

This was an introductory workshop organized as part of a US-sponsored technical assistance activity (total budget US$527,280) in support of the Ugandan Ministry of Energy and Mineral Development (MEMD) to prepare a strategy and regulatory structure for the development of an indigenous biofuels industry in Uganda. Context is that Uganda is currently facing an energy crisis, as drought has severely reduced the capacity of its hydroelectric power production, and oil prices have increased the costs of transport and thermal power production. MEMD competitively selected NOVI Energy to conduct the

assistance. The UNEP mission seized the opportunity to participate in this workshop so as to meet key stakeholders in Ugandan energy sector and get an early update on the nature of the energy crises as well as an update on ongoing and planned efforts to deal with them.

Selected contributions by participants during plenary discussions:

- MEMD representative (Mr. Godfrey Ndawula, Asst Commissioner for New and Renewable Energy) delivered a presentation on "Status of Biofuels Development and Production in Uganda" (see Annex 1). Highlights included energy services demand assessment, biogas potential in Uganda and planned biofuels activities.
- Mr. Anand Gangadharan (President, Novi Energy) provided a detailed description of the NOVI Energy technical assistance activities and a model of a bioenergy production and consumption system on which a specific "Strategic Blueprint" and Investment Plan for Uganda will be based. A copy of the detailed presentation could not be obtained, but NOVI Energy has agreed to keep UNEP updated on the evolution of its technical assistance work. During about a year long project, NOVI will explore the energy that can be generated from biofuels in Uganda (crops, garbage, and manure crops). The study will also seek to find suitable energy crops that should be used as feed stock for production of energy, where they should be grown, legislation and licensing regimes, as well as the social-economic benefits to Ugandans who will grow the crops. The use of local resources for energy and recycling is expected to help improve energy security of Uganda. Small renewable energy plants based on biofuels could be set-up after the study has been completed.

Besides the above two major presentations, GTZ Regional Advisor Steffen Roettcher spoke about GTZ activities in Uganda, Tanzania and Kenya, highlighting the main options available in each country, GTZ initiatives to support specific programs and the main barriers that needed to be addressed, including policy issues. GTZ concluded that biofuels was not a viable option for Kenya and one of the major obstacles to biofuel development is current policy environment, which is unfavourable. On query they informed that the benchmark price of imported oil used in the study to calculate viability was taken as $90 per barrel.

General comments/reactions by participants included the following:

- Traditional farming approaches in Uganda can co-exist with corporate approaches in the NOVI Energy strategy. Economic criteria will determine the choice between the two on a case-by-case basis.
- The biofuel/food security debate is not happening in isolation; it is part of a broader debate on national development strategy. Within this broader context, programs are in place to support peasant farmers to make the transition to corporate farming (as part of the policy to modernize agriculture). Assessments of the risk of food insecurity arising from the promotion of biofuels should therefore take into consideration the potential impacts of agricultural modernization efforts on these risks (e.g. reducing the risk through greater food productivity). In other words, when viewed in

terms of developments in other sectors, the food security issue may not be as scary as it might appear from the narrow perspective of the energy sector.

- In order to reduce the risk of food insecurity in pursuing its biofuel initiative, NOVI Energy will focus initially on traditional crops such as sugar cane as feedstock, instead of introducing new crops. Assessment of potential new crops will be an on-going process with primary criterion being productivity/yield per area.
- Subsistence farming is a barrier to the full realization of Uganda's biofuel potential. Modernization is needed. Processes can be put in place (including training, contracts for supply, etc) to help farmers make the successful transition to modern (corporate) farming methods.
- The example of Brazil diminishes the validity of the fear that biofuel production will threatens food security. For example, one of many strategies that made the Brazilian success story possible was agricultural zoning and resource mapping/assessments made accessible publicly. Such practices and services yielded many benefits, including facilitating access to bank financing for would-be energy crop farmers and project developers.
- Lack of clear and supportive government policy framework is a key barrier to the production and use of biofuels in Uganda and Africa generally. E.g. in Kenya, a barrier to biofuel development is the ambiguity of the law regarding the legality producing biofuel (including straight vegetable oil) for own use or sale.
- There are huge opportunities in biofuel production, utilization and exports that are being missed by Uganda. Benefits include – avoided costs of fuel imports, employment generation from the bioenergy industry, additional revenues from exports to OECD countries, etc. There opportunities can be realized without endangering food security and environmental management.
- Uganda is already food insecure – even without a biofuel industry. Hence the real issue is how to promote biofuels without worsening the situation. Indeed, there is an opportunity to reduce food insecurity through promotion of biofuels since the modern techniques of biofuel production can be transferred to food production as well.
- Aside from food security, it is also important to consider the dangers of deforestation in the studies and final report to be submitted by NOVI.

Ministry of Energy and Mineral Development

This meeting was to apprise MEMD officials about UNEP activities. Presentations were made by both UNEP and URC highlighting the relevant activities in the energy area.

Day 3: 26-08-09

Mrs. Specioza Ndagire, Uganda Energy Credit Capitalization Company (UECCC)

- As part of the first phase of ERT (ERT I), the Ugandan government implemented a Refinance Facility (RF), the purpose of which was to provide long-term funding to small scale private-sector led energy

businesses with installed capacities < 20MW. Total funding available was US$16 million. It was later reduced to $12 million since only 2 projects could be supported through the facility. These were;

  - 12 MW Cogen plant by a Sugar Mill with financing of US$7.7 million.
  - A small-hydro plant (IPP) with financing of US$3.75 million. This second project is not yet operational due to delays in dam construction.

- Interest rates on loans included refinance rate (of Bank of Uganda) + margin of participating institute /banks (3% margin of banks). Refinance rate was based on *weighted average of time deposit rates* and ranged between 7 – 8%. Participating banks. For hydro project, the margin was 2 %, and hence average rate of interest was 10%.
- Phase 1 of ERT is winding up . Two issues still need to be addressed are; (i) A lack of project proposals indicated a lack of capacity among project developers in project packaging . (ii) Banks were also reluctant to come on board for financing.
- Solar Window was started as a part of ERT in 2006. It was t; (i) refinance for big solar projects (IPPs), and (ii) provide micro-finance for small solar with a view to develop the market. For smaller projects, the Solar Window (SW) operated through micro-finance deposit-taking institutions (MDI) started up in 2006. The creation of the RF was to facilitate rural access to solar PV technology. Design of the RF was based on a World Bank-sponsored Sri-Lankan model, and entailed a combination of:
  - Vendor financing (addressing entrepreneur seed/working capital issues); and
  - Consumer financing (addressing user-affordability issues).
- The refinance rate offered at the SW is based on same principle adopted under ERT I: *weighted average of time deposit rates.*
- Each MDI participating was provided lump-sum refinance with US$300000 allocated to it.
- Prior to implementation of the RF (i.e. during the design phase), selected MDIs were invited to participate in awareness building/capacity-building activities that included attending a workshop in Sri-Lanka, following which 2 MDIs expressed interest and joined the programme. Each of these two MDIs opted for a different business model as follows:
  - Working capital loans to solar companies was opted by one.
  - Sri Lankan model- equipment leasing based on MoU (ownership remains with MDI until loan is paid up). In this model, the MDI is responsible for the financial part while vendor handles technology aspects

  Off-take of loans however remained low.
- A PV Targeted Market Approach (PVTMA) was launched in 2008 with $425K, implemented through a working committee involving REA and Bank of Uganda. PostBank is a participants in the PVTMA. Disbursements began in February 2009. PostBank has approved 70% of the US$425K.
- Uptake of other banks involved in PVMTA was slow. Anecdotal evidence suggests the following as the main reasons for the low uptake:
  - Low awareness of solar and its applications.
  - Loan products (i.e. lease and working capital) on the market by MDIs were too expensive; e.g. 30% interest in the case of lease. In the vendor's model, small companies had problems with collateral requirements for working capital loan.

    - Lack of commitment on the part of the MDIs.
- Main lessons learned:
    - Lack of capacity on the part of entrepreneurs to develop bankable proposals for financing.
    - Limited awareness and interest of mainstream financial institutions to invest in small scale projects. Major weakness of these banks included inability to evaluate such 'unfamiliar' small-scale RE projects.
    - There was information asymmetry between project sponsors and banks e.g. banks did not trust sponsors and considered them generally high-risk/low returns investment opportunities. In this regard, it is worth noting that well-known international project sponsors such as Agha Khan (?) found it easier sourcing funding from the banks than smaller local businesses and entrepreneurs.
    - Most of the money came from re-finance with banks providing hardly 10%. Leverage of private sector finance was thus not significant.
- Design and implementation of ERT II is informed by the preceding lessons. Main sources of funding for energy ventures under ERT II include subsidy from REA and debt finance under a revamped refinancing scheme. Refinance is now replaced by credit support facility. UECCC has been set up to manage RE promotion and investment activities under ERT II. It combines a number of instruments to facilitate local bank lending to RE projects. Three basic services/mechanisms are offered by the UECCC:
    - Providing partial risk guarantees covering the construction phase risks characteristic of the first 2 years of construction (for big projects mainly).
    - Providing refinancing facility that allows banks to approve longer term loans beyond what they would normally accommodate (e.g. 5 years).
    - Independent credit appraisal for projects being considered for financing by the banks. This component includes provision of training for banks to enable them appraise RE projects
- For the Solar Window under ERT II, the plan is to continue the refinancing approach, but in partnership with REA under PVMTA. REA will be responsible primarily for coordination. Specifically, the structure of responsibilities are as follows:
    - UECCC → refinancing of MDIs
    - REA → coordination and EUF/subsidies
    - Private Sector Foundation → business development services delivery
- Total funding for overall project is US$6.8m (seed capital) and it will consider renewable.
- Additional funding will be determined by demand expressed in the pipeline of projects; a pipeline already exists and is growing.

Uganda National Renewable Energy Association: The following participated in the discussions;

Messrs Richard Kanyike (Solar Energy Uganda); Gobera Abraham (CAFEX Solar Systems Ltd); Kimbowa Emmy (Energy Systems Ltd); Kithinji Musyoka ; Abdalla Kyezira (Konserve Consult Ltd); Abhay Shah (Ultra) Tec); Jonathan Kigya (Power Communication Systems).

- UNREA representatives called for coming up with some models that can be replicated. Association can work as an entity in these efforts. They emphasized the need for working closely with solar industry association as a means of scaling up/replicating proven business models, ensuring product quality standards, and other market creating/transforming interventions.
- The main barrier facing energy entrepreneurs in Uganda is financing; seed and working capital. E+Co from which many of them have previously received assistance does not appear to be able to provide the needed assistance. A lack of capacity is the second important barrier.
- Some members of the UNREA do not support the idea of working through local banks to provide seed/working capital to energy enterprises; their loan terms are unfavorable and do not take into account the special role and difficult operating conditions that the energy entrepreneurs face. Donors considering providing financing to energy enterprises should consider setting up a special window dedicated to the financing for energy SMEs under more favorable terms [Yet some would like donors / partners to work through local banks and Ministry of Energy. They cited UNDP funded programme with commercial banks , which provided vendor financing as well as a good beginning in that direction. The main rationale put forward by UNREA members for treating energy enterprise financing as a 'special case' requiring special treatment is that the clean energy SME sector has the potential to deliver far-reaching development benefits and therefore deserved to be nurtured through their initial difficult phased of development until they can stand on their own. One practical approach to addressing their needs is to factor their potential development impacts into the cost of loan products offered to them, e.g. in the form of interest rate subsidies.
- Some members mentioned that sector needs to be looked in totality and grants should be avoided, and indicating example of Brazil, where it did not work. Guarantee funds should be set up to encourage local banks to lend to energy SMEs.
- UNREA members will articulate their ideas into a formal proposal in consultation with MEMD, to be forwarded to UNEP as input to a UNEP sponsored RE support initiative.

Mr. Albert Rugumayo, Energy for Rural Transformation (ERT) Coordination manager

- Gave an overview of variety of ongoing and required interventions in the energy sectors, and Identified neglected areas of RE development initiatives in Uganda where urgent action is needed as:
    - Biomass energy efficiency through:
        - Expanded access to improved cook stoves; and
        - Re-forestation to protect local biomass resources (e.g. establishment of community based forestry systems in Senegal's Progede example)
    - Expanding rural access to small-scale decentralized energy systems based on:
        - Biogas
        - Gasification
    - Extending distribution lines and harnessing pieco hydro power
- Evaluations of improved stove program is with GTZ, and will be shared with UNEP team
- US$6 m Dutch funding is expected to be available soon for scaling up biogas program to finance 20000 units

- ERT I aimed at increasing number of transmission lines, establishing mini grids and promoting stand alone solar systems. Small hydro and grid connected power were also promoted. It included promotion of mobile solar PV systems, capable of powering 3 LED based lights, a radio, and a battery charging facility, priced about $50, of which end user was required to pay between $20 to 30. Vendor financing was also a part of the promotional mechanism.
- Solar water heaters (SWH) are also an option and could be viable if legislation is put in place e.g. bye-laws to ensure that all buildings install SWHs. Currently, instant water heaters are used, which heat water quite fast and are economical with price at around $40. A SWH is relatively expensive but may not incur running costs. Electricity is subsidized in Uganda, costs about eurocent 25 /KWh to produce but sold at eurocent 12 per KWh to end users. This can be an issue in promotion of SWH.
- Incentives for use of solar include:
    - Tax relief
    - Capital investment subsidies – up to 45% from the Rural Electrification Fund
- ERT Phase II targets (see report for details):
    - Connect 20000 people with Solar PV systems (20 W systems)
    - 200 hydro power plants (1 MW each)
    - PVTM A based on a targeted market approach
    - Grid extension to reach 113000 customers
- Biomass resource assessment has been done and can be seen in the Energy Policy document. Periodic update of the same may be needed.

Mr. Benon Bena, Rural Electrification Agency (REA):

- An indicative master plan for 10 years exists and within this there is a 3.5 year framework.. Specific targets have been defined in the plan.
    - Implementation is being operationalized within the framework of the following governance structure:
        - National level (central government) → district (# = 100) → Sub-counties (# = 800) → Town Councils or villages.
    - In case of urban centres, there are Municipal Councils in place of Sub-counties, and Boards below the Town Council levels (The structure is as follows; Cities → Towns → Town Centres).87% of population live in villages; 13% in cities and towns. The growth rate of population is about 3.3%.
    - Electricity access is currently about 10%; 4-5% in rural areas and about 40% in urban.
    - Centres of towns, also known as Growth Centres, are targets of electrification / grid extension. The structure is as follows; Cities → Towns → Town Centres Grid extension only covers centres of towns, referred as "growth centers" and is the responsibility of UMEME (UEDCL), the distribution company, with a 20yr. concession (within concession agreement, there is money for investment). Cost of 33 kVa line is about US$25-35 000 /km. The UMEME can however go only up to 1 km from the grid for electrification.
    - Beyond growth centers, the electrification option being considered is solar PV.

- Where it is expensive to extend the grid to growth centres, mini grids have been planned. REA however is extending grid and giving new concessions.
- A problem with grid extension is the high non-technical losses. Though privatization was expected to reduce these losses, this has not happened. This is possibly because the concession agreements did not commit private operators to reducing the losses. One strategy could have been to link the revenues of the concessionaires to the existing losses such that they have an incentive to reduce the losses in order to maximize revenues.
- Mini-grid is for relatively rapidly growing towns. Mostly diesel fueled gensets. Solar-diesel hybrid being considered for mini-grid systems with possible GTZ funding. Solar will provide base load; diesel for peak. The recent discovery of oil opens up the possibility of using heavy fuel oil from refinery to power the gensets in the hybrid systems. Further, some wells have been found to contain gas, which in turn can be used to power the gensets.
- Policy in Uganda is to restrict solar to mini-grid systems, which are isolated grids. The main rationale for this is that there is already an economically viable potential of 2000 MW hydro on the Nile that can be fed into the grid
- Grid extension is done by government (including mini-grid). These are then concessioned out to private operators to manage and maintain.
- ERT will provide solar PV systems to schools (on grant basis), water supply facilities and health centres. Agencies implementing projects in these areas have an energy component and they use ERT for that.
- Individual access to electricity is to be achieved using small solar pv systems (mobile). Subsidy is provided to reduce the cost of each system (US$5.5/w up to 50 w). Market price of a 50 W solar PV system is about US$800 – 900. Main end-use for which the system is used is lighting. 4-7 lights and a small TV (with some lights) can be served by the system. CFLs are used for lighting.
- In the targeted market approach, end-user financing for solar pv systems is provided through regulated and unregulated FIs. Main FIs involved are: FINCA, PostBank, and Centenary Rural Development Bank. Loan recipients also receive subsidy (referred to above). Participating FIs have a line of credit from Bank of Uganda; so government bears the foreign exchange rate risks. The participating FIs all have MFI arm, which makes them suitable for the program.
- FIs generally prefer to provide lending only in the context of donor-funded programs e.g. WB projects. Main problems in other cases (when it is not a donor project) are:
    - Quality of systems (technology risks)
    - Weak capacity of state organs to enforce regulations/standards.

  Mostly, these issues have been addressed in projects through product standards and pre-qualifications, which provide confidence to FIs. Possible solutions in other cases are:
    - Establish government-sponsored test centers; vendors are required to have their products tested, and only certified vendors are allowed to participate in the program.

        - Require participating vendors to provide after sales services within a specified distance from the shop.
    - A problem faced is that professionalism of some solar appliance vendors tends to drop over time once the funded phase of a project is over. As a result, product quality drops and FIs become reluctant to lend due to customer rejection of faulty appliances. It was observed after UNDP project ended in 2003 and some FIs continued funding for sometime thereafter.
    - The challenge is ; (a) How to go down to smaller systems to reach to the poor- the base of pyramid (b) ensure quality (through test facilities), and (c) provide subsidy. For example to 1 W and 2W LED lanterns. No mechanism exists and although Saving and Credit Societies (unregulated) exist, they do not have enough funds and need credit lines. Micro Finance institutions had credit lines from the central bank, but it has decided to withdraw from development financing.
    -
    - Uganda Development Bank (Rural Bank ?) exists, but due to poor reputation, does not attract customers looking for financing of RE distribution mechanisms.
    - Target level of energy access under RES: 10% by 2011, but now changes to 2012 due to delay in implementation.
    - Main mandate of REA is to test best practices/ concepts through pilots with the purpose of scaling up. Example, gasifiers to be tested by MEMD.
    - Other aims of REA:
        - Improved energy efficiency. Biomass depletion is a major rationale for this. An important aim is to get urban users to switch from charcoal to LPG. Major problem in this regard is standardization of bottles e.g. Shell and Total bottles are not interchangeable. Consideration is being given to the idea of first targeting the larger-scale charcoal users through "institutional stove programs."
    - Important to note that LPG programs will have little chance of succeeding in rural areas. Main reason being that rural people are not used to paying for their fuel (biomass), hence there is a cultural barrier to switching from wood fuel to LPG. LPG promotion should focus on urban areas.
    - Biogas potential in rural areas is being examined. The main potential barriers include:
        - Quantity and quality of feedstock available
        - Adequacy of water

Day 4: 27-08-09

Mr. Ronald Kitawu, Combusto Uganda Ltd:

- Seeking UNEP assistance to market their product (a fuel additive that can extend the distance traveled per liter of gasoline). Suggested that UNEP can help by endorsing a "green fuel" campaign that creates public awareness of the benefits of products similar to that of Combustor. Combustor can then operate under this umbrella to sell their product as a "green fuel" that provides savings to users while bringing environmental (avoided pollution) and development (avoided oil imports) benefits.

Mr. Henry Bidasala-Igaga, Electrical power division (EPD), MEMD:

- Feed-in tariff policy has been implemented in collaboration with the transmission company UETCL, which is empowered to buy in bulk from IPPs and sell to the distribution company (UEDCL – Umeme). The feed-in tariff has an important risk reduction function – giving 'comfort' to the IPP.
- The feed-in law guarantees full cost recovery to generators. Exception is the publicly-owned mini-grid in Northwestern Uganda where the generator is also the distributor.
- Electric Power division looks after the transmission. The transmission company, Uganda Electricity Transmission Company Limited (UETCL), is government owned and buys all the power from generators and sells to distribution companies. After de-bundling, transmission is handled by the government while generation and distribution has been privatized. UETCL is the owner of assets; management of the assets is contracted to Eskom.
- The generators include:
    - Aggreco Ltd.: 100 MW (50*2)
    - Jacobsen: 50 MW
    - Sugar producers (Cogeneration) : (a) 12 MW to grid (production 19-20 MW), and (b) 5 MW
    - Kasese Cobalt Co Ltd (Hydro) .: 10.5 MW. Sells to the grid at 75% of the retail rate.
- Total grid connected capacity in Uganda today is 560 MW., excluding the isolated (mini) grids.
- Potential for geothermal is 450 MW. Preliminary investigations of shallow wells underway.
- Small hydro potential is about 200 MW and big hydro potential 2000 MW.
- A legal framework is required to support biofuel development in Uganda. E.g. policy on blending.
- There is a need for DSM pilot studies. Sometime back, Government imported and distributed CFLs for free; 3 to each household. It solved the problem of peak demand immediately, which otherwise required load shedding. 800, 000K bulbs were imported, of which 600, 000 were distributed under the pilot program. There is a need to create awareness and sensitize people about such possibilities.
- Capacity needs of EPD includes CDM.
- Tariff review : Generators apply for review and require approval of the regulatory authority. The revision is done in a 'democratic' way – it is advertised publicly; citizen reactions are invited and factored into final tariff rate decision.

Day 5: 28-08-09

Professor William Kyamuhangire, Department of Food Science and Technology, Makerere university:

- Energy sector is closely connected to other sectors of the economy, but this connectedness tends to get lost in discussions of energy sector issues. RE policy development should not be pursued in isolation from other sectors.
- A strong 'drive for development' already exists in Uganda; all that is needed is to channel these motivations in the right direction to produce results.

- Government needs to put in place the needed systems and infrastructure (good roads, airports, energy systems, in short, 'public goods') that allows people to pursue their individual and collective development efforts.
- Subsistence production reflects the 'wrong mentality' in today's world. Also with small landholdings means producing crops at marginal level and subsistence living continues, making RE irrelevant to a large segment of society.
- Firewood and charcoal are mainly used in cities and no policy to provide other fuels exists. Even industries use firewood; for example, 50% bakeries in cities use firewood. Electricity sector has not developed, leading to this situation. A cascade of dams along the river Nile can help solve this problem.
- Regarding energy infrastructure development, the private sector can play a critical role. A good example in this regard is the Kakyira Sugar Factory, generating 20 MW of power, of which it sells 12 MW to grid.). However, the private sector needs incentives and guarantees to perform its role. PPP offers a viable model to combine private and public sector strengths.
- An enabling condition for development is consistency in national policies. Also, countries cannot survive in isolation and need to join hands. The creation of regional economic communities, e.g. the East African Community (EAC) is essential. . EAC can be the beginning of an economic Union by 2011 – technical work in this direction is already underway. An EAC will guarantee stable political environment within which private sector and PPP initiatives can thrive. Example of common practices is the banning of plastics by all EAC members (puts pressure on individual members to follow same). Similar common policies can be pursued in future.
- Regional cooperation in Africa is important, for example regional grid to transfer power from one country to other. Uganda- Rwanda electric is ready but there is no power to share as of now.
- Energy prices are major drivers of energy usage but energy is needed at low prices for development.
- Electrical services are poor, system is in bad condition and commercial losses are high. Measures such as using pre-paid cards may be helpful.
- Regarding biomass: Uganda needs to go beyond biomass for the poor. E.g. the presence of a growing middle-class suggests that there will be a market for more modern energy sources and forms. Against this background, the goal of achieving 50% electrification is not ambitious enough.
- There is a need to work on making electricity affordable to the majority.
- Theft/loss of electricity during T&D is due to negligence of UEB. Too many barriers to get connected to the grid compels people to use illegal methods.
- Electricity distribution issues:
    - Umeme, a recipient of substantial government subsidies, is nevertheless very inefficient as a private distributor and a commission to audit their work has been set-up and started their work.
- Biofuels vs. food:
    - 90% of the population depends on biofuels, primarily on wood and charcoal to meet their energy needs.
    - Major challenge is how to make its use more efficient
    - Growing of biofuel can be a lucrative business

- Rate at which forests are being destroyed is alarming
- Uganda currently imports 70% of vegetable oil needs; price of veg oil is higher for food than for fuel, making it difficult to use vegetable oil for fuel. Similarly, price of sugar in Uganda is the highest in the region. There is no risk that farmers will divert vegetable oil/food crops to fuel rather than food; they know better and will meet their needs for oil first before considering sale for fuel.
- Coffee and tea production did not cause food insecurity. The food security 'scare' is overblown and could prevent Uganda (and Africa) from benefiting fully from the development potential of biofuel. The food vs.. fuel debate tends to assume the flawed assumption that farmers are irrational.

Mr. Haneishi Yusuke, Japan International Cooperation Agency (JICA):

- JICA is planning to commence a grant-funded solar powered systems distribution project in rural areas. The focus will be on institutional and public buildings and places. One option being considered is to build enough solar PV capacity at central locations e.g. schools, hospitals etc, where households can come and charge mobile solar pv units. The program will be implemented in collaboration with private companies (a PPP) in a win-win arrangement that allows them also to gain market share for their products while government achieves its goal of expanding access to modern energy services for the population.
- Main challenges to expanding access: price of lantern without solar panel is $15. If solar panel is added, price reaches $50/unit. JICA will however subsidize the systems.
- Two studies have been carried out this year, one on off-grid solar PV option and the second on business enterprises development for off-grid hydro (IPPs). JICA sees ERT as a good opportunity to implement the recommendations of the studies. JICA is interested in working with other donors to support Ugandan RE efforts. However, contributing to a common fund or budget support directly to government is not consistent with Japanese policy. Would rather prefer to provide technical assistance on design and implementation of programs to expand access to remote areas. This kind of work can be carried out for common funds also for example.
- JICA notes that the GoU has started to develop a sector-wide approach, specifically a Power Sector Investment Plan (funded by the WB) is under development. It will provide a guide for donors to determine which parts they can support. JICA is waiting for the PSIP (delayed).
- JICA is supporting a Hydro-power Development Plan (HPDMP) for Uganda. One site under consideration is Ayagor (450MW). Japanese government not yet committed to feasibility study but could be supported after the master plan is ready.
- Uganda has a vision for 2035; The National Vision 2035. It seeks to achieve 100% electrification in rural areas. This will require putting in place 4000MW capacity. This Vision is linked to a 5-year National Development Planning process.

Dr. Izael Pereira da Silva, Center for Research in Energy and Energy Conservation, Makerere University

- The enabling conditions for RE development in Uganda exists. There is a good coincidence of available technology, potentially large market (unmet demand); and willingness of all key stakeholders including donors.
- RE feed-in tariff is too low (7-9 cents /KWh; 9 cents/kWh first 6 years) to attract private investment.
- "Energy sector" is in dire need of expansion to provide energy access to the people in Uganda with less than 10 W of installed capacity as compared 1100 W in South Africa. This requires capacity building in the energy sector for project implementation where there are several studies but a lack of implementation. It is evident from the little success is recorded on the attainment of the goals set in documents such as the percentage of people with access to the electricity grid in rural areas, or the number of SHS installed or the setting up of mini-grids in non-electrified areas. The government therefore needs to look beyond their own resources towards the academia and also setting up modalities to work more hand in hand with the Private Sector. The government, academia and private sector partnership can help create "clusters of excellence" similar to IT industry and film industry in the US, which helped development of these sectors.

- GTZ is deeply involved in development of energy sector in Uganda. GTZ has an on-going RE and EE program. Energy sector needs champions to develop and in Uganda, the following are key people and institutions in the energy sector;
    - Minister of energy
    - Director of Energy
    - Hear, ERA (handles licensing of all power projects)
    - Head, Uganda Investment Authority (responsible for creating/maintaining investor-friendly policies). Uganda is one of the most investor-friendly countries in the EA region (?)
    - Commissioner Energy
    - Private sector foundation, Uganda. Is supported by the WB; is involved in the Uganda Manufacturers Association.
    - GTZ, who have deep interest and activities in energy sector.
    - REA.
- Government needs to put a team of people together to implement ideas / projects. An example is biofuel, where there is a lot of potential to move forward , as funds are also available.

Dr. May Sengendo, East African Energy Technology Development Network (Energy Network):

General Note: Dr. Sengendo provided a detailed description of the work being done by the Energy Network. Details have been documented and will be sent to the UNEP team. Some highlights of the consultation are presented below:

- The energy network was set up in 1998. with 15 members from 10 countries including Kenya, Tanzania, Uganda (documentation to be sent to UNEP team).

- Within energy, the network works in five thematic areas such as energy and technology development, gender and energy, and so on.
- Energy technology development : An example is development of micro-hydro projects. In this;
    - The Network undertakes hydrological studies funded by the Nile Basin Initiative. Subsequent Micro-hydro projects were funded by UNDP-GEF and NBI. 80 kW to be developed, which will be scaled up during the second phase. In some cases, help from carbon funding may be needed.
    - Development and dissemination of improved drying technology:
    - It was initiated with solar drying of pineapples, a project funded by DFID. First dryers were provided by the Fruits of the Nile Company Ltd. Energy network collaborated with National Agricultural Research Organisation (NARO) to develop better solar driers. They developed hybrid dryers- installed kilns so that drying is possible in all seasons. Energy Network thus helped provide better dryer technology and helped connect exporters and producers (farmers). Quality also improved with new drier. Demand picked up as a result of this.
    - Current emphasis is on quality control and efficiency in the use of the charcoal fuel for the driers.
- Gender and Energy work : the Energy Network is the focal point for Energia for this.
    - Gender-sensitive energy needs assessments and the formulation of appropriate policies. Funding has also been received from EU and DGIS to mainstream gender into projects and policies and build capacity for the same. The Network also contributed to:
        - Preparation of the REP document and is involved in National Biogas Program that involves value-chain analytic approaches.
        - Poverty reduction action plan
    - Gender audits of policy documents already prepared in order to highlight gender issues and thus influence the final design of implementation strategies and plans. In one project for example, policies of some countries were audited and pointed out what could be improved to meet the concerns related to gender.
- Research advocacy and documentation: The Energy Network undertakes research and disseminates results that inform specific policies and programs, e.g.:
        - Financing models for energy systems (solar PV), worked with GTZ. It involved making links with manufacturers and their agents / franchises near demand areas, and bringing micro-finance there. The model has been adopted by the government of Uganda.
        - Institutional and group financing. Group provides the guarantee in this case.
- Inter-sectoral work (water, energy, agriculture and climate change) including:
        - CDM capacity building services for the Ugandan Investment Authority staff
        - Government agencies and NGOs
    - UNEP Ecosystem Assessment Project under PEI:
        - Demonstrating the risks to ecosystems posed by current patterns of energy production and use, and formulating measures to address them based on best practices.

Martin Mukiibi, Energy Institute of Uganda

- Energy Institute is primarily involved in capacity building
- Low level of capacity is a major problem in the Uganda Energy sector, mainly in the areas of hardware and policy development. Although both the national energy policy and renewable energy policy documents have been prepared, no real details on implementation are developed. Most policy development work is lead by technocrats in ministries; there is little input from other actors e.g. private sector, research institutions, and other stakeholders. A "cut-and-paste" approach dominates the policy making process. It thus lacks community participation. There is a need to change strategy for policy making.
- How to involve key stakeholders:
    - In the case of the private sector, entrepreneurs can be integrated into the deployment of RE options by providing them with enterprise development services and also making them aware of the available funding opportunities. However, there is also a need to streamline procedures for applying for and receiving assistance. For example, there were funds for promoting efficient charcoal stove but many entrepreneurs were not aware of that.
    - Entrepreneurship development and building their capacity is important.
    - It is important to keep in mind that most entrepreneurs have problems moving into rural areas due to high costs.

Mr. Nils Darflot, Norwegian Embassy

- Uganda, Tanzania and Mozambique currently priority countries for Norwegian support. NORAD is no longer the agency through which support is provided; it is currently through the Ministry of Foreign Affairs which is mandated to focus on a few large projects including generation and transmission. Currently, there is no interest in small-scale/household solar PV etc projects.
- Initially involved in Bugoye hydro power project (13 MW) expected to be commissioned in October.
- Also supporting capacity building work in UETCL by StatNet (a Norwegian transmission company) on planning cycle and procedures related to transmission system.
- Other projects:
    - Supporting 50MW thermal plant to serve Kampala in 2008
    - Feasibility study for transmission line from Karuma to Kampala, funded by Norway with $2m (representing 100% of total cost)
    - Possible financing feasibility study for Rural electrification projects: 3 in north and 3 in South
    - Increasing generation capacity at Isimba – feasibility study could be taken up.
    - Support for transmission line from Mputa to Nkenda
    - Focus is mostly on grid connected areas.
    - Total investment requirements may reach $4 billion for capacity expansion projects. Therefore, private sector participation is necessary.

- Policy requirements:
    - Predictable policies/stable political regime
    - Opportunity to enter into reliable binding agreements e.g. PPA that allows full recovery
    - International guarantees on investments may be needed.
- Norwegian government will be supportive of tariff subsidy support in certain cases, and in collaboration with other donors. One approach to keep the subsidy level within reasonable limits is to implement competition for PPAs, and offer subsidy to the private operator that can operate with the least subsidy.